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Internal Waterways of the U.S.S.R.

1. The Volga Watercourse

(a) General

The Volga is 3746 kms long. It has about 300 tributaries, with a total length of over 45,000 kms. The total length of the rivers of the Volga watercourse is 85,722 kms.; of these, 17,277 kms. are navigable, including: (1) the Volga, with the Oka, Moskva, and the Klyazma; (2) the Kama, with the Vyatka, the Belaya, and the Ufa; (3) the Mologa, Sheksna, Kostroma, Unzha, Sura, and Vetluga. Of the 42,631 kms. of the watercourse suitable for log-floating, a part belongs to the rivers on which there is no traffic, but which have possibilities for such purposes if improvements were made. This group includes the rivers Kotorosl, Sura, Kuvayshi (upper part), Sviaga, Kerzhenets, Bolshaya and Malaya Kokshaga, Sok and Bolshoi Igrin (tributaries of the Volga), the Moksha and Tsna (tributaries of the Oka), the Vyshera, Chanovaya, Ik and Ish (tributaries of the Kama), and some 25,184 kms. of unexplored rivers. The Volga system, which is the thirteenth largest in the world, covers an area of 1,550,000 sq. kms., with a population of more than 45 million people.

(b) Sources and Depths

The sources of the Volga lie in the western district of the Ostashkov region, in the vicinity of the village of Volgino-Verhovye, 221 meters above sea level.

The deeper parts of the Volga are at the following places:

Tetyushi	15 meters
Near the Undorga Mountain	20 meters
Near the Zhiguli Mountain	6 to 15 meters
(deepest places are at Zhiguli, opposite Stavropol)	
Cherni Yar	13 meters
Vetlianskaya Station area	20 meters
Zemyany Station area, near Astrakhan	30 meters and over

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121321

From the Astrakhan area to the sea, depths vary from ten to fifteen meters.

(c) Ice-free Periods

Conclusions drawn from observations of the last ten years of the periods of navigability of the Volga and tributaries are as follows:

River	Point of Observation	Date Ice Begins to Break	Annual Average No. of Days Rivers are Navigable
Volga	Kalinin	April 14	205
	Gorki	April 21	200
	Samara	April 18	203
	Saratov	April 17	207
	Astrakhan	April 23	260
Kama	Perm	April 27	190
	mouth of Kama	April 26	193
Oka	Orel	March 30	---
	Ryazan	April 13	205
	Gorki	---	205
Moskva	Moscow	April 14	175
	Kolomna	April 13	205

2. Rivers and Artificial Watercourses

(a) The Volga (general):

At the village of Kotoshino, there is the artificial upper Volga dam (Verkhnyi-Volzhskii Biishlot). With the waters of the lakes above (Malyi and Bolshoi Verkhit, Sterzh, Vseluga, and Peno), the dam forms the reservoir which enables the Volga to carry traffic from Rzhev to Rybinsk. The dam collects about 350 million cubic meters of reserve water.

Small steamers ply up and down the Selizharovka river and on Lake Seliger; the latter is eighty kms. long and is, in places, twenty to twenty-five meters deep.

There are thirty-two small rapids between Beishlot and Rzhev, and six between Rzhev and Kalinin. The largest rapids is the Benski, which lies between Zheltsy and Rzhev.

(b) Traffic on the Volga:

Regular steamship traffic on the Volga begins at Rzhev. The distance from this point to Kalinin is 179 kms.; the journey requires fifteen hours downstream and twenty-four for return. Vessels stop at nine jetties on the way. The steamers on this route have single decks.

Steamers plying between Kalinin and Rybinsk are a little larger; some are of American design, with two decks. The downstream journey requires thirty-one hours and the return journey forty-four. Steamers on this winding route, which is 390 kms. long, are somewhat hindered by rocks and shoals, and in most cases traffic is interrupted from the second half of July to the beginning of September because the upper Volga Dam is unable to supply sufficient water to the upper Volga during the low water period of the summer.

On the right, at a point sixteen kms. below Lisinsi, the 140 km.-long Shosha River enters the Volga; this river is navigable for only the last five kms. Ten kms. below the mouth of the River Medveditsi, the River Nerl flows into the Volga. The Nerl is neither navigable nor suitable for log-floating. Near Rybinsk, the Volga is entered by the River Sheksna, from which the Maria Canal begins.

(c) Towns, Villages, and Installations:

The town of Rybinsk lies 390 kms. downstream from Tver. There is a shipyard at this town, for repairs only.

The distance from Rybinsk to Gorki by water is 502 kms; steamers require thirty-seven hours for the downstream journey, stopping in eighteen places, and forty-seven hours for return.

On the left shore twenty-three kms. from Yuryevets is Sokolskoe, which is used as a wintering-place. A shipyard for repair work is located here.

Eight kms. downstream from the village of Katunki is a pleasure resort, Vasilievo, on the right bank, at the point where the river forms a large bay. Vasilievo is also used as a wintering-place, where repairs to vessels are made.

Farther downstream, on the left bank, is another wintering-place, Gorodets, where there is a shipyard for wooden ships.

A shipyard for the construction of oil tankers, passenger vessels, and tugs is located at Balakhna, a village on the right bank twenty kms. from Gorodets.

Seventeen kms. from Gorki lies the town of Sormovo, on the left bank, where there is a wintering-place and the Molotov ship-repair yards.

A shipyard for wooden ships is located at Krasnoarmeisk, which is twenty-seven kms. downstream from Stalingrad. There is also a shipyard at Astrakhan.

(d) The Kama (general):

The River Kama is the most important of the tributaries of the Volga. It is 2707 kms. long and is navigable for a distance of 1215 kms., from the point at which it is entered by the River Vishera to the point at which it joins the Volga. During the spring flood period, small vessels are able to go as far upstream as the village of Kai. The upper reaches of the Kama, above the navigable section, are very winding; however, in general, log-floating is possible.

The width of the Kama at the mouth of the Vishera varies from 200 to 400 meters, increasing to two kms. at the confluence of the Belaya. The lower parts of the Kama are five to six kms. wide, in places, during the flood period.

There are wintering-places for ships at Zaozerie (nineteen kms. downstream from Khokhlovka), at Beregovyie Chelni, and at Chistopol.

(e) The Oka:

Of the tributaries of the Volga, the Oka is second in importance. It is 1465 kms. long, and, at Orel, it is about seventy meters wide.

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The upper Oka is not navigable as far as Orel, but is suitable for log-floating.

The lock and dam of Belomutovskii are located south of Lovtsi. Downstream is the Kuzminskii lock.

At Dzerzhinsk, there is a shipyard for small vessels for use on the Caspian Sea. Repairs are made on vessels at Dudenovo, which is also a wintering-place.

(f) The Belaya:

This river, rising in the Ural regions, is a notable tributary of the Kama. It is navigable from Sterlitamaki onward, and regular traffic is maintained between this town and Ufa, a distance of 426 kms. Steamers going downstream complete the journey in twenty-two hours, while the reverse direction requires forty-eight hours.

Five kms. above the town of Ufa, the River Ufa enters the Belaya. The Ufa is 837 kms. long, and is navigable for a distance of 405 kms., as far upstream as the town of Shafeevo; it is suitable for log-floating for 780 kms.

The journey along the Belaya from Ufa to Kazan is 1039 kms. Passenger ships, going downstream and making twenty-eight stops, travel this distance in sixty-two hours. In the opposite direction the journey requires eighty-five hours.

3. The Northern Waterway System

(a) General:

The most important rivers of the northern system are the Vologda, Sukhona, Yug, Luza, Malaya Severnaya Dvina, Bolshaya Severnaya Dvina, Vychegda, Sysola, Vymy, Pinega, Vaga, Pechora, Usa, Izhora, Mezen, Onega, and Kuloi. The total length of the system is 94,606 kms., of which 9,943 kms. are navigable and 66,958 kms. are suitable for log-floating.

(b) The Vologda is a tributary of the Sukhona. Length 130 kms.; navigable distance, 45 kms.; width, 55 to 100 meters; current is weak.

(c) The Sukhona rises in the Kubenskoe Lake. Length, 562 kms. to its confluence with the Yug. It is divided into three parts: (1) The Upper Sukhona, 64 kms. in length from Lake Kubenskoe to point of confluence with the Vologda; width, 25 to 80 meters; depth, one to two meters; (2) The Central Sukhona, 278 meters long up to the mouth of the Kochenga, width, 250 meters; depth, two to eight meters. Several shallows; rapid current. (3) The Lower Sukhona; length, 220 kms.; maximum width, 400 meters. Several stony shallows.

The Sukhona usually freezes over during the first days of November, and becomes ice-free about the end of April. The total ice-free days are usually from 180 to 190. It is navigable throughout, and in the spring flood periods fairly large vessels ply between the towns of Vologda and Archangel; during low-water periods, vessels of small draught run to Kotlas. The Sukhona is linked by canal with the Volga system and the Baltic Sea, by the Kubenskoe Lake.

121327

(d) The Veliki Ustyug. There is a shipyard on this river, situated four kms. from the town, on the Mikhailov Bay.

(e) The Malaya Severnaya Dvina forms at the confluence of the Sukhona and the Yug rivers. The river is seventy-two kms. long and from three to five kms. wide during the flood period. Over a distance of sixty-eight kms. of the river, there are twenty-five shoals, five of which are rocky in nature.

(f) The Severnaya Dvina. Length, 670 kms.; width, from 300 to 600 meters; maximum depth, 21 meters; navigable throughout, from 170 to 195 days each year.

This river forms at the point of confluence of the Vychegda and the Malaya Severnaya Dvina. It has many islands and shoals; the shores are high and chalky, with beaches of sand and coarse gravel. The Severnaya Dvina forms a waterfall approximately 65 kms. from the mouth.

(g) The Yug. Length, 430 kms., breadth, 50 to 150 meters (the lower reaches, 60 to 250 meters wide). There are some 90 shoals along the upper reaches, as the terrain in that region is hilly. There is shipping on the river in the spring and during high-water periods. The water route from Nikolsk to the mouth of the Yug is 361 kms. long.

(h) The Luza. Length, 415 kms.; breadth, 50 to 150 meters. This river is a tributary of the River Yug and is navigable in the spring, when ships go as far as Noshkul, a distance of 365 kms.

(i) The Vychegda. Length, 1130 kms.; rises in the Komi region; breadth along the upper reaches, between 80 and 200 meters, and between 300 and 600 meters in the lower reaches. It is navigable for 960 kms. Ships ply between Kotlas and Syktyvkar (434 kms.), and reach Ust-Kulom in high-water periods; occasionally, the Vychegda is navigable as far as Kerchenie, a distance of 295 kms. from Syktyvkar. The river usually freezes at the end of October, and becomes ice-free during early May.

Tributaries of the Vychegda

The Sisola: navigable in the spring as far as Kazhima (317 kms), and in August as far as the village of Voshcha (132 kms.).

The Vim: navigable only in high-water periods, up to the village of Voslyanski (158 kms.).

The Vishera: navigable in spring and autumn to the village of Bogovodski (58 kms.).

The Keltma: navigable only in high-water periods, up to the Katerina Canal.

The Vaga: a tributary of the Dvina. Navigable in the spring as far as the mouth of the Kuloi.

The Pinega: a tributary of the Dvina. Length, 656 kms., of which 473 kms. are navigable.

(j) The Pechora and tributaries

The Pechora River rises in the western part of the Urals. It is 1800 kms. in length and divides into three sections, as follows:

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121321

The distance from Zaporozh'e to Kherson is 297 kms., the downstream journey requiring about 26 hours (17 stops) and upstream, 34½ hours.

The main shipping routes on the Dnieper are:

(1) Kiev to Dnepropetrovsk (514 kms. long, passenger vessels requiring 31 hours downstream and 46½ hours for return, making 20 stops)

(2) Kiev to Mozyr

(3) Kiev to Chernigov

Vessels used on these routes are American types, with two decks.

(c) The Desna

This river, 1178 kms. long and from 50 to 350 meters wide, is the most important of the Dnieper tributaries. It is commercially navigable from Bryansk to the mouth of the river, a distance of 830 kms. The Desna has several shoals, especially along the upper reach. The minimum depth between Chernigov and Kiev is between 50 and 60 centimeters. The annual period of navigation on this river is from 7 to 8 months.

Passenger vessels ply between the following points:

(1) Bryansk and Novgorod-Seversk (281 kms. long; downstream journey, 22 hours, 13 stops; upstream, 31 hours)

(2) Novgorod-Seversk and Chernigov (238 kms.; downstream journey, 24 hours, 16 stops; upstream, 34 hours)

(3) Chernigov-Kiev (215 kms.; downstream, with 8 stops, 13 hours; upstream, 19 hours)

(d) The Pripet

The Pripet is 800 kms. long; widths vary from 100 to 500 meters, and the average depth is about 40 centimeters. In the upper reach, this river is connected with the Veikseli via the Dnieper-Bug canal, and with the Neman River via the Oginsk canal. It is navigable from Tura to the mouth of the river. The distance from Tura to Mozyr is 164 kms.; for the journey, steamers require 10½ hours downstream, with 6 stops, and 14½ hours for return. Steamers also ply between Mozyr and Kiev, a distance of 285 kms., taking 19½ hours downstream, with 16 stops, and 27½ hours - upstream.

Small river vessels are built at Petrikovo, a town located on the Pripet River.

(e) The Sozh

This river, navigable for only 286 kms. from Propoiski, is of little importance to shipping. Widths in the navigable section vary between 50 and 150 meters. At normal level the minimum depth is 60 centimeters.

(f) The Berezina

The Berezina is navigable only from [redacted] to the mouth of the river, a distance of 398 kms. Passenger vessels ply between Borisov and Bobruisk; the route is 232 kms long, requiring 19 hours for the downstream journey, with 5 stops, and 26 hours for return. The river is important for lumber-floating.

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121321

(1) The upper reach from the source to the Volosyanitsi River; width, from 10 to 100 meters; current, swift; course, winding.

(2) The middle reach, from Ust-Volosyanitsa to Ust-Tsylma, is 1200 kms. long. This section is navigable.

(3) The lower reach, from Ust-Tsylma to the Pechora Bay. Widths along this section reach five kms.

The surface area of the Pechora is 320,000 sq. kms. Vessels have difficulty in navigating the mouth of the river because of the shoals.

Tributaries of the Pechora

The Usa: navigable for 254 kms., except in very dry summers.

The Izhma: navigable in spring for 321 kms.

The Tsylma: navigable for about 48 kms., in the case of vessels of not more than a 90 cm. draught.

The Mezen: eight hundred kms. in length; from the source to the confluence of the River Vashka, the Mezen is from 70 to 170 meters wide, after which it increases to 800 - 1500 meters. At Mezen, it is 2.5 kms. wide.

The Onega: length, 640 kms.; navigable during the flood period only. Suitable for lumber-floating.

The Kuloi: length, 344 kms.

(k) Artificial Waterways

The waterway system of the Dvina River is connected with the Volga and Neva systems by the Sukhona River and Kubenskoe Lake.

The waterway from Sheksna to Archangel is 1400 kms. in length, of which 135 kms. are artificial.

The length of the canal between the Kuloi and Pinega rivers is 56 kms. It has a single-chambered lock; the minimum width of the canal is 20 meters and the depth is normally 90 cms.

4. The Northwest Waterway System

(a) The Neva

The River Neva is 75 kms. long. It is reminiscent of a deep canal, linking the entire central lake and river area with the Baltic Sea.

The sources of the Neva are in the area southwest of Lake Ladoga; the river, at this point, is shallow and has many shoals. When the water is at normal level, vessels are able to navigate the Neva along the west bank, if their draught is not more than two meters. The widths along the upper reaches are from 200 to 700 meters. Near the village of Ostrovskaya, 25 kms. from the source, is the Ivarov rapids where the current is very strong in places, rising to a rate of 3.5 meters per second. After passing the rapids, the rate of the flow of current drops from one to 1.7 meters per second. The depth through this rapids

is at least 4 meters, increasing to 6.5 to 14 meters below the rapids. The lower reach in the Leningrad area is 17 meters deep along the main channel.

The Neva is navigable, on an average, for 220 days of the year. It freezes at the end of November and the ice begins to break up at the end of April.

(b) The Olheva

Length: 220 kms. The widths from the source to the center vary from 130 to 380 meters, and at the mouth it is 640 meters wide. The depths vary from 2 to 17 meters. The current flows at a rate of ½ to 1 meter per second along the center channel, and 2½ meters per second in the sections where there are rapids; the latter lie between the 150th and 188th km. points from Lake Ilma and are an obstruction to normal shipping. The river freezes at the beginning of November and becomes open at the beginning of April; the average navigational period is 200 days.

(c) The Vytegra

Only 57 kms. of this river are of practical use; it forms a link with the Maria waterway system and has been made navigable by means of dredging and other operations. A canal joins the Vytegra with the Kovzha River.

(d) The Kovzha

This river has also been made navigable, by artificial means, from the new Maria canal to Lake Beloe, a distance of 66 kms. This section contains two locks, without which navigation would not be possible.

(e) The Sheksna

Length: 425 kms. This river is one of the main links with the Maria system.

(f) The Mologa

Length: 580 kms. Flows into the Volga and is navigable along its middle reaches, for vessels of small draught.

5. The Maria Waterway System

The artificial waterway system, known as the Maria (Mariinski) System, is 1145 kms. long, with navigable river sections, equipped with locks, for a total distance of approximately 522 kms; the total length of the lock section is 307 kms., and there are 311.5 kms. of canals.

The Maria System begins by running along the Neva for 75 kms., then borders Lake Ladoga for a distance of 168 kms., and leads directly into the mouth of the Svir River. The purpose of the canals around Lake Ladoga is to allow small river vessels to negotiate the lake; larger vessels are able to cross the lake regardless of rough weather, thus shortening the distance of the route by some 46 kms.

The Ladoga canals are composed of two watercourses running side by side - the Old and the New Ladoga Canals. The former is 172.8 kms. long and has numerous locks. Vessels therefore usually use the New Canal, which is 25.5 meters wide. Landslides cause the width to lessen in places, thus requiring

frequent repair work.

After leaving the canal, vessels proceed along the Svir to Lake Onega, where the course continues through the Onega Canal. This canal, 67.2 kms. long and 18 meters wide, borders the southern part of the lake and finally runs to the mouth of the Vitegra. From there the journey continues down the Kovzha river by a second canal, 8.5 kms. long and 21.5 meters wide. After passing through the lock sections (30 kms.) of this river, vessels are able to proceed with a free current to Lake Beloe. Encircling this lake is a third canal, 76 kms. long, 23.5 kms. wide, and from 2 to 13 meters deep, with two locks, or sluices.

The water-level of this canal is regulated by the use of Lake Leseko-Azatskoye as a reservoir, in conjunction with special dams. After passing the second lock, vessels proceed to the Sheksna River, the shallow section (228.3 kms. long) of which is provided with locks, beyond which there is a clear run of 180 kms. to the Volga.

The journey from Rybinsk to Leningrad requires an average of 45 days. The open period varies from 150 to 185 days.

The Maria Waterway system accommodates vessels measuring about 75 meters by 9.5 meters, with a draught of 2 meters. It is equipped as follows:

Sluices or locks	513
Dams	53
Outlets	44
Flood dams	22
Bridges	429
Repair installations	110

The dams are of wood, with the exception of those in the Sheksna River, which are larger and have concrete foundations. The locks in the Sheksna are of stone; all the others are of wood.

4. The Dnieper Waterway

(a) General

The total length of the rivers connected with the Dnieper Waterway is 23,801 kms., of which 5,167 kms. are navigable, 7,327 kms. are suitable for lumber-floating, and 11,307 kms. are not used; the system covers a surface area of 518,533 sq. kms. Of the 200 rivers and streams in the Dnieper system, 143 flow directly into the Dnieper River.

The largest of these rivers are the Dnieper (2,333 kms.), the Pripet (800 kms.) the Berezina (585 kms.), the Desna (1,178 kms.), the Sozh (660 kms.), and the rivers Drut, Teterev, Irpen, Trubezh, Ros, Sula, Tasmin, Psiol, Vorskla, Orel, Samara, and Ingulets.

(b) The Dnieper

The annual navigable periods of sections of the Dnieper are as follows:

Section	Freezes	Breaks up	Ice-free Days
Upper (Orshakieva)	Dec. 3	April 4	243
Middle (Kiev - Dnepropetrovsk)	Dec. 19	March 27	267
Lower (Zaporozh'e - Kherson)	Dec. 16	March 11	280

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5. The Bug River

This river is 835 kms. long and is navigable from Voznesensk to the mouth, a distance of 155 kms. The minimum depth, normally one meter, varies from 3 to 5 meters along the last 100 meters. The Bug is navigable for approximately 265 days each year.

Vessels travel from Voznesensk to Kherson, a total of 231 kms., requiring about 15 hours in either direction, with 15 stops.

6. The Don Waterway System

The actual length of the River Don is 1980 kms.; however, the length of the entire waterway, including the tributaries, is 7100 kms., of which about 4000 kms. are of practical use - 2000 kms. for navigation and 2000 kms. for log-floating. The course of the river is very irregular; for every straight kilometer, 1½ kms. are winding.

The level of the river, from the source to the mouth, is as follows:

Section	Meters above sea-level
Upper reach	202 (above Sea of Azov)
Voronezh	90
Pavlovsk	70
Ust-Medveditsa	45
Kalach	27
At mouth of northern Don	8

In the upper reach the maximum depth is 2 meters, and the width 40 meters. At the former Voronezh district border, the Don broadens out to 200 meters, and the depths vary between 1 and 8 meters. Between Voronezh and Kalach harbor, a distance of about 900 kms., the middle reach of the Don is from 140 to 300 meters wide and from 2.5 to 8 meters deep. There are many shoals. The lower section of the Don appears to be a great navigable river, as it widens to some 400 meters and deepens to 16 meters; however, the depth suddenly diminishes to 40 cms.

The upper and middle sections freeze over during the last half of November, and become ice-free by the end of March or the beginning of April. The flood season lasts about a month. The navigable part of the river becomes free from ice within four or five days from the beginning of the break-up.

The only vessels capable of sailing from the source to the mouth of the Don are flat-bottomed boats, 12 to 35 meters long, and 4 meters wide. Coastal vessels are able to reach Rostov, while steamers ply regularly along the lower reaches. The greatest hindrance to shipping on the Don are the shoals.

7. The Kuban River

The Kuban River is about 900 kms. long; it does not freeze over regularly, and it is open to traffic for more than 10 months of each year. It is fully navigable for 235 kms., from Krasnodar to Temryuk. Depths vary between 1 and 4.5 meters.

8. The Ural Waterway System

The total length of the Ural System is 3979 kms., of which 833 kms. are navigable, 2498 kms. suitable for log-floating, and the remaining part unused.

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The Ural River

This river is 2470 kms. long. Only the section of the river from Uralsk to Gurev (833 kms.) is navigable. Widths are 30 to 180 meters along the upper reach, 130 to 200 meters at Uralsk, and 400 meters along the lower reach.

During the flood period the water level rises to about 7 meters above normal at Uralsk and to about 2.5 meters above normal at the mouth of the river. The Ural usually freezes early in November and becomes ice-free about the middle of April